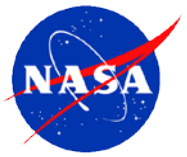




# Education Highlights

Susan M. White  
External Relations  
Johnson Space Center  
September 20, 2010



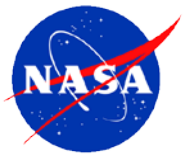
# NASA STEM Education

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NASA Science, Technology, Engineering and Math (STEM) Education:

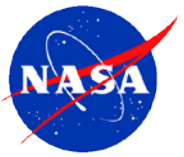
Inspiring, Engaging, Educating and Employing the next generation of explorers and innovators.

- We are part of an agency STEM Education network, coordinating with HQ Office of Education, Mission Directorates and Centers, collecting metrics to support OMB reports
- NASA Education utilizes the agency's unique resources to promote STEM Education
- All Education projects align with the three Education Goals:
  - Workforce Development
  - Strengthening the Pipeline
  - Public Benefit



# Teaching From Space Overview

Cynthia McArthur  
Manager, Teaching From Space  
Johnson Space Center  
September 20, 2010



# Teaching From Space Timeline

Getting Started

*Late 1980s*

Moving Forward

*1990s*

On Demand

*2000s*

- Management of two NASA Teacher-in-Space Projects
- Educator resource guides
- Educational videos (Beta/VHS)
- Website development
- Astronaut support
- On demand multimedia
- Shuttle-based payloads and interactive events
- ISS-based payloads and interactive events

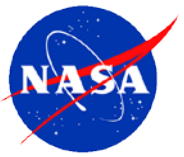




# Teaching From Space

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Teaching From Space facilitates opportunities for K-12 educators and students that use NASA unique missions, flight platforms, and research facilities.



# Teaching From Space – FY10

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<i><b>K-12 Participants</b></i>	<i><b>Total</b></i>
<i><b>Students</b></i>	<i><b>108,000</b></i>
<i><b>Educators</b></i>	<i><b>10,000</b></i>

# Access to on-orbit video

- **eClips**

[www.nasa.gov/eclips](http://www.nasa.gov/eclips)

- 10 videos
- 3 educator guides
- 5000 views on YouTube
- Regional Emmy

- **Day in the Life**

[www.nasa.gov/education/tfs/dil](http://www.nasa.gov/education/tfs/dil)

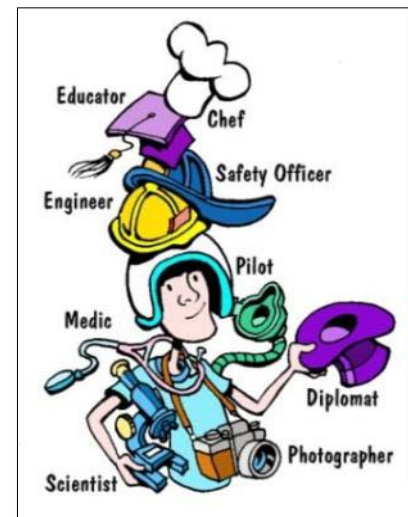
- 15,000 page views since March 2010

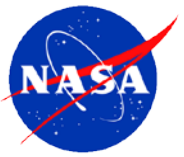
- **DIY Podcast**

[www.nasa.gov/education/diypodcast](http://www.nasa.gov/education/diypodcast)

- 130,000 page views - FY10

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# Real-time classroom connections to space

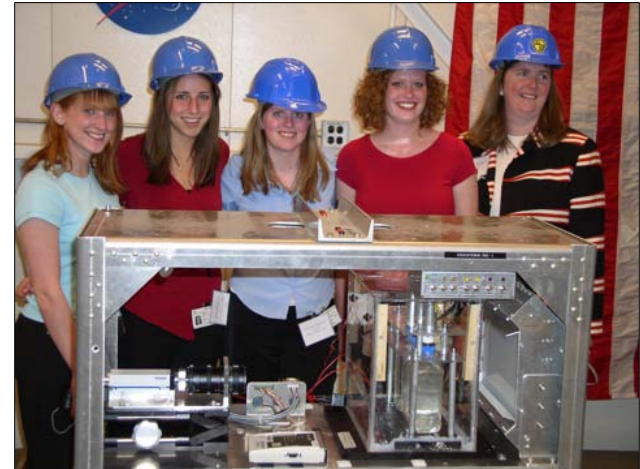
- ARISS – FY10
  - 52 US and international contacts
  - 17,000 students
  - 1,000 educators
- ISS Education Downlinks – FY10
  - 15 US downlinks
  - 7 ISS International Partner downlinks
  - 33,000 US students
  - 850 US educators
- ISS EarthKAM – FY10
  - 3 missions
  - 30,000 students
  - 400 educators





# Authentic inquiry-based learning experiences

- Dropping in a Microgravity Environment (DIME) – FY10
  - Glenn Research Center
  - New start in FY09
  - 140 high school students
  - 27 high school educators
- Student Launch Initiative - FY10
  - Marshall Space Flight Center
  - Collaboration begins – FY09
  - 11 educator rocketry workshops
  - 14 educators
  - 140 students



# Authentic inquiry-based learning experiences

- Reduced Gravity Flight – FY10
  - Johnson Space Center and National Science Teachers Association (NSTA)
  - Collaboration begins – FY10
  - 45 high school educators
- BalloonSAT – FY10
  - Glenn Research Center
  - Collaboration begins – FY10
  - 16 high school students
  - 3 high school educators

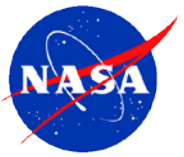


# National education plans

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- Development of comprehensive education plans
  - Associated with 3 Space Shuttle missions
  - Ground-based and on-orbit education activities
  - Education activities - pre-mission, mission, and post-mission
- National scope
  - Seeds flown on STS-118
  - National distribution of seeds
  - Plant Growth Chamber Engineering Design Challenge
  - Over 2 million K-12 students engaged

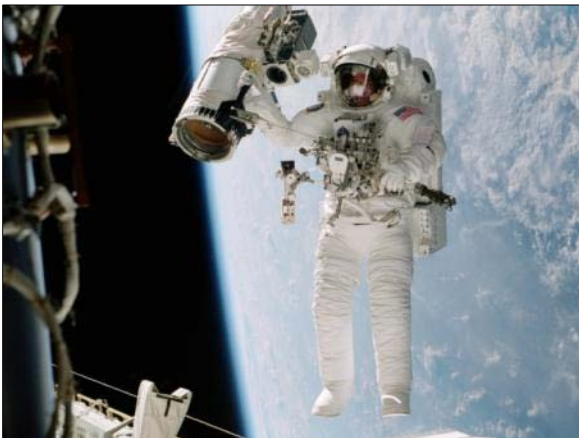




# Education Web site development

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- 3 education Web sites
  - Each site focuses on single topic
  - Spacesuits - [www.nasa.gov/education/spacesuits](http://www.nasa.gov/education/spacesuits)
  - Careers – [www.nasa.gov/education/careers](http://www.nasa.gov/education/careers)
  - Robotics – [www.nasa.gov/education/robotics](http://www.nasa.gov/education/robotics)
  - “One stop shopping” for educators and students
  - All resources and materials located at one site
  - 400,000 page views in FY10



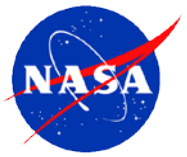


# Robotics Education

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- Robotics Website  
<http://www.nasa.gov/education/robotics>  
145,989 page views in 2010
- Robotics Alliance Project
- Opportunities for Educators and Students
- Lesson Plans  
22 products on-line
- Career Corner  
14 profiles



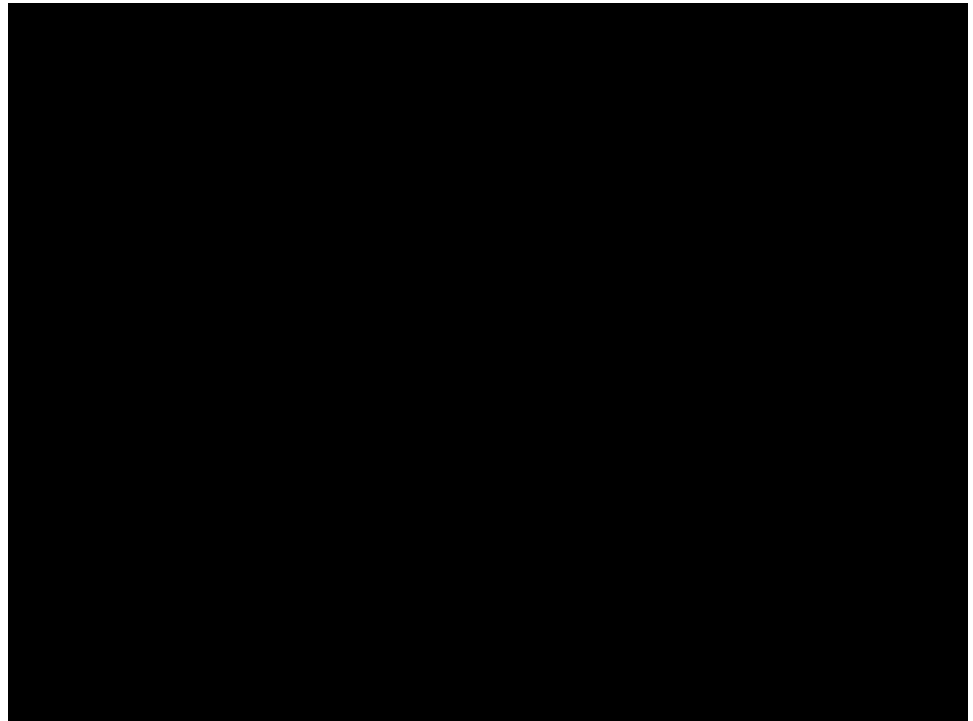


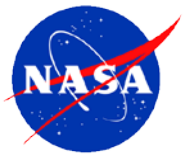
# Robotics Education

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- Robotic Competitions

- FIRST
- FIRST LEGO League
- Botball
- VEX
- BEST
- Lunabotics Mining



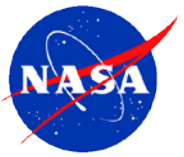


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# NASA Aerospace Scholars Overview

Linda Smith  
Manager, External Relations  
Johnson Space Center

September 20, 2010



# NASA Aerospace Scholars Successes

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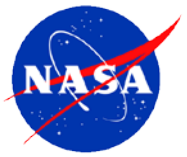
- JSC model replicated in 4 other states
- 17 weeks offered in 5 states to 726 students  
Summer 2010
- Each student commits ~ 160 hours to participate in the on-line curriculum and summer experience
- 3,700+ alumni
- Statistics
  - 87% responded “This experience inspired me to learn more STEM.”
  - 85% are interested in science careers
  - 83% are interested in engineering careers







# NASA High School Aerospace Scholars Benefits



- Great return on investment
  - Strategic partnerships
  - JSC Partner/NASA dollars spent ratio 7:1
- Students nominated by their state legislators
- Educator involvement provides the multiplier effect
- Pipeline Activity

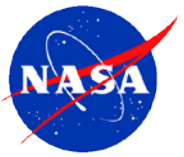


# What is High School Aerospace Scholars (HAS)?



- JSC partners with
  - State government
  - All high schools
  - Universities
  - Education foundations
- Space exploration is the inspiration
- Opportunity for high school juniors
- Immersive multi-month commitment
  - Introduces students to NASA and its mission
  - Six-day on-site culminating visit

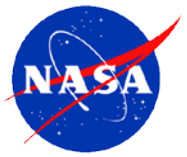




# What is High School Aerospace Scholars?

- Lessons are aligned to State and National standards
- 8 on-site summer weeks offered
- Mentored by NASA and co-op/ interns
- Provided at no cost to students
- Eligible for one year science elective for high school graduation

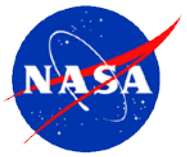




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# ISS National Lab Education Project

Mark Severance  
Manager, ISS NLE Project  
Office of Education  
September 20, 201



# ISS National Lab Enabling Legislation

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- **Education has always been an important component of the NASA mission**
  - NASA's educational mission charge is contained in the agency's enabling legislation, the Space Act of 1958
- **The NASA Authorization Act of 2005 provided direction to NASA to increase utilization of the ISS by other US Government agencies and the private sector through partnerships, cost sharing agreements or other arrangements that would supplement funding of the ISS**
  - US Segment of the ISS designated as a National Laboratory
- **The 21<sup>st</sup> Competitiveness Act directed NASA to incorporate Science, Technology, Engineering and Mathematics (STEM) related activities as part of the ISS National Laboratory mission**
  - New activities through partnerships which complement ongoing activities



# An Educational Resource for the Duration of the ISS Program

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- The ISS National Lab Education Project strives to allow for participation in the ISS mission by the world wide public, educators and students at the K through Post Graduate levels
- The Project will continue to develop a portfolio of STEM educations activities pertinent to the ISS Program and aligned with the NASA Office of Education outcomes



# New Partner Driven ISS Educational Activities

- Commercial Generic Bioprocessing Apparatus (CGBA) Student Investigations (CSI) allow students to conduct ground based control group experiments using classroom based apparatus nearly identical to the onboard equipment
  - Over 180,000 students participated in the Monarch butterflies life cycle experiment of CSI-4
- Synchronized Position Hold Engage and Reorient Experimental Satellite (SPHERES) internal satellites flying inside the ISS under the control of student developed software



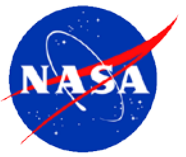


# New Partner Driven ISS Educational Activities

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- Nanoracks/CubeLab: Self-contained cubesat form factor laboratory modules enabling student as well as professional grade experiments
- The Kids In Micro-g student microgravity design competition was inspired by the Buzz Lightyear on ISS outreach program
- Buzz Lightyear Mission Logs special feature videos on the re-release of Toy Story 1 and Toy Story 2 showcased life onboard the ISS





# Kids In Micro-g Video Clip

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# Ground Based ISS Educational Activities

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The High Schools United With NASA to Create Hardware (HUNCH) program enable middle school and high school students to build ISS flight and training hardware

HUNCH involves 20 High Schools in 8 states

The United States Military Academy Cadets will be providing project management support for HUNCH hardware developed at schools located in New York state

